

What is claimed is:

1. A high frequency circuit module,
wherein RF circuit parts are mounted on both
sides of a multilayer dielectric substrate, and
5 transmission lines connecting said RF circuit
parts on both sides are constructed by a group of vias
having a periodical structure or vias having a coaxial
structure extended in the direction perpendicular to
the face of said multilayer dielectric substrate.

10 2. The high frequency circuit module according to
claim 1, wherein said via group having the periodical
structure is constructed so that a plurality of vias
are distributed around a center conductor at an
interval which is equal to or smaller than 1/4 of
15 wavelength of a signal of said transmission line.

20 3. The high frequency circuit module according to
claim 1, wherein said via having the coaxial structure
is formed by a center conductor and a cylindrical
conductor surrounding said center conductor and
connected to a grounding conductive layer provided in
said multilayer dielectric substrate.

25 4. The high frequency circuit module according to
claim 1, wherein a high frequency circuit part provided
on one of the faces of said multilayer dielectric
substrate is an antenna.

5. The high frequency circuit module according to
claim 1, wherein said multilayer dielectric substrate
includes three or more dielectric substrate layers, a
5 microstrip transmission line of a millimeter wave
circuit part is formed by a pattern of a surface
metallic layer of a first layer and a metallic layer
provided between the first and second layers, and a
metallic layer formed in another intermediate layer in
said dielectric substrate has a transmission line to
which an intermediate frequency signal generated by
said millimeter wave circuit part is connected.

10 6. The high frequency circuit module according to
claim 5, comprising a both-sided two-layered dielectric
substrate in which a final layer on the side opposite
to the first layer of said multilayer dielectric
substrate is larger than the other plurality of
dielectric substrates of said multilayer dielectric
substrate,

15 wherein a metallic layer of an antenna pattern is
formed on one of the faces of the final layer, and
a support plate is formed in the portion where
said other dielectric substrates are not stacked on the
20 other face of said final layer.

25 7. The high frequency circuit module according to
claim 1, wherein said multilayer dielectric substrate

is provided with a grounding metallic layer as a layer lower than a grounding metallic layer used as a counter electrode of the microstrip line made by the surface metallic layer as a millimeter wave transmission line,
5 and a metallic layer for transmitting an intermediate frequency signal and a metallic layer for a millimeter wave circuit power providing line to avoid crosstalk of a millimeter wave signal in the surface layer are provided between said grounding metallic layers.

10 8. The high frequency circuit module according to claim 5, wherein said multilayer dielectric substrate is constructed so that the lines for intermediate frequency signal and the high frequency signal are disposed between said grounding metallic layers and do not cross a sealing portion of said multilayer dielectric substrate with said hermetic cap.

20 9. The high frequency circuit module according to claim 8, wherein said plurality of other dielectric substrates are a multilayer substrate made of glass ceramic or alumina ceramic, and said both-sided two-layer dielectric substrate is a both-sided two-layer substrate made of teflon whose permittivity is lower
25 than permittivity of said plurality of other dielectric substrates, and said support plate is any of a metal plate, a metal plate in which holes are opened to increase a heat dissipating efficiency, a hard organic

substrate, a hard organic substrate in which holes are opened, and a hard organic substrate in which holes are opened and which is metal plated to increase thermal conductivity.

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10. An automotive radar module,
wherein an antenna metallic pattern is formed on
one of faces of a multilayer dielectric substrate,

10 RF circuit parts including an oscillation circuit,
a power amplifier for amplifying a part of an output of
said oscillation circuit and supplying the amplified
output to said antenna, and a mixer for mixing a signal of the
oscillation circuit are formed on the other face of
said multilayer dielectric substrate, and

15 a transmission line for connecting said antenna
metallic pattern and said RF circuit parts is
constructed by a group of vias including a periodical
structure or vias having a coaxial structure provided
20 in the direction perpendicular to faces of said
multilayer dielectric substrate.

11. The automotive radar module according to claim 10,
wherein the group of vias including said periodical
25 structure is constructed so that the vias are
distributed around a center conductor at an interval
which is equal to or smaller than 1/4 of a wavelength
of a signal of said transmission line.

12. The automotive radar module according to claim 10,
wherein said via having the coaxial structure is formed
by a center conductor and a cylindrical conductor
5 surrounding said center conductor and connected between
grounding conductive layers provided in said multilayer
dielectric substrate.